

Trend Study 9-1-00

Study site name: Red Mountain Allotment .

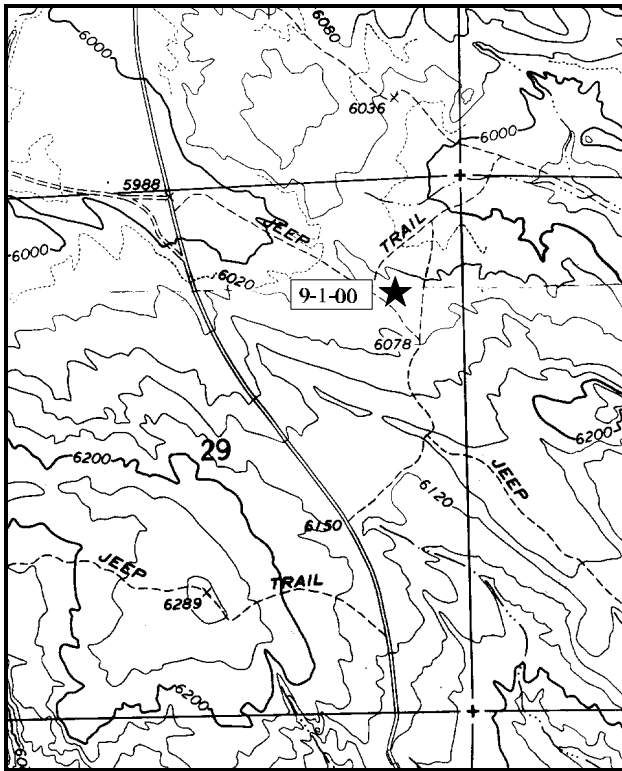
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 9°M, 105°M .

First frame Placement on frequency belts 5 feet. Frequency belt placement; line 1 (4ft), line 2 (28ft), line 3 (45ft), line 4 (77ft), line 5 (89ft).

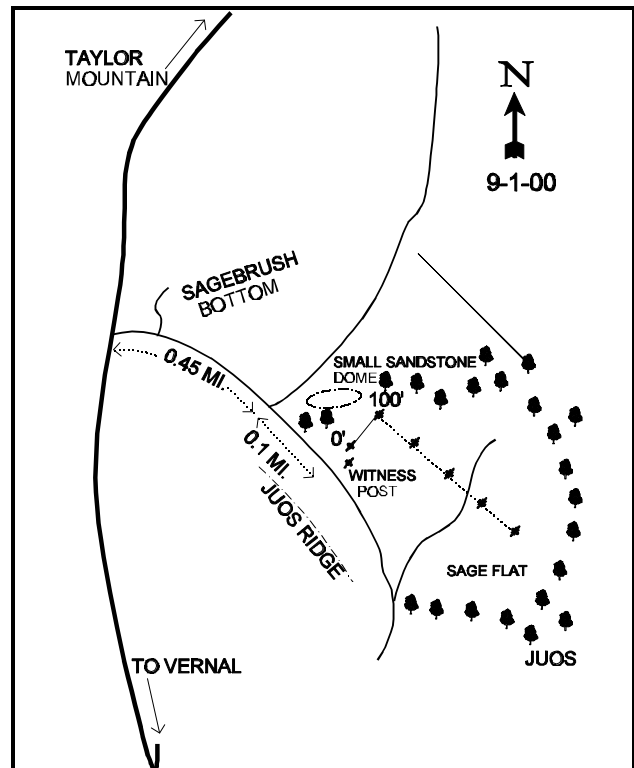
LOCATION DESCRIPTION

From Highway 121 (500 N) west of Vernal in Maeser, go north on 2500 West for 3.25 miles to the Ashley substation. From there, continue 2.0 miles to a dirt road to the right in the sagebrush bottom. Turn and go east for 0.45 miles to a fork. Stay right and proceed just less than 0.1 miles. The 0-foot baseline stake should be visible in the sagebrush along the left side of the road. The study can also be located by walking 75 paces bearing 167°M from the east end of the sandstone dome to the 0-foot baseline stake.



Map Name: Steinaker Reservoir

Township 3S , Range 21E , Section 29



Diagrammatic Sketch

UTM 4487661.851 N, 620389.985 E

DISCUSSION

Trend Study No. 9-1 (11-1)

The Red Mountain Allotment trend study is located on big game winter range above Vernal. The site supports a nearly pure stand of Wyoming big sagebrush surrounded by pinyon-juniper covered rocky ridges. The terrain at the study site slopes gently to the north (3-5%) with an elevation of just over 6,000 feet. Pellet group transect data taken along the study baseline in 2000 estimate moderate use by deer (47 deer days use/acre, 116 ddu/ha) and light use by cattle (1 cow day use/acre, 2 cdu/ha). This study is in the Red Mountain cattle allotment which is grazed in spring or fall on a deferred system.

Soils texture is a sandy loam which is moderately deep and somewhat excessively drained. Estimated effective rooting depth is over 16 inches with a relatively high average soil temperature of 70° F. Sites with high soil temperatures are more susceptible to invasion from weeds, primarily annual species. Soils are moderately alkaline (pH of 7.9) and low in organic matter. Although this site lacks continuous ground cover in the interspaces, runoff is low and the erosion hazard is slight due to the nearly flat terrain. Some pedestaling around shrubs is evident. Percent bare ground was moderately high in 1982 at 35%, but steadily declined to 21% in 1995. Due to drought in 2000, bare ground slightly increased to 25% with vegetation cover decreasing from 34% to 30%. Seventy-two percent of the vegetative cover comes from shrubs. Compared to herbaceous vegetation, shrubs are less effective at protecting against soil erosion from high intensity summer storms. An extensive cover of cryptogams (18%) provides added soil protection which is important at this site due to low herbaceous cover.

Wyoming big sagebrush is the dominant browse species, comprising 84% of the browse cover in 1995 and 90% in 2000. Sagebrush cover averages around 20%. Sagebrush density is currently estimated at 5,440 plants/acre with a relatively high rate of decadency at 65%. The current level of decadency is a dramatic increase from 15% in 1995. Although, percent decadency was nearly as high in 1988 at 53%. Percent decadency has been highly variable between sampling years since the establishment of this site in 1982. It is apparent however, that sharp fluctuations in decadency are mostly weather related as use of the sagebrush since 1988 has been mostly light to moderate. With numerous drought years since the late 1980's, sagebrush has undoubtedly been affected by the dry conditions. Currently ('00), 37% of the decadent plants are classified as dying which represents about 1,300 plants/acre that could be lost from the population. Young recruitment is currently very low (60 plants/acre) and not adequate to replace the decadent, dying plants in the population. Coupled with high decadency in 2000, the proportion of the sagebrush population in poor vigor also increased from 6% in 1995 to 25%. The increase in poor vigor is most likely drought related as well, which has been documented on other trend studies in this unit in 2000. A return to normal precipitation would improve these downward trends on sagebrush.

All other browse species present on the site are infrequent and include: stickyleaf low rabbitbrush, prickly pear cactus, Stansbury cliffrose and prickly phlox.

Herbaceous vegetation occurs mainly under the canopy of sagebrush, leaving large bare interspaces between individual shrubs. Annual species dominate both the grass and forb components. The dominant grasses are annual cheatgrass and sixweeks fescue that account for over 80% of the grass cover in both 1995 and 2000. Sixweeks fescue sharply declined in nested frequency in 2000, while cheatgrass significantly increased. This increase in cheatgrass frequency is somewhat surprising with the dry conditions in 2000. Perennial grasses are in low abundance with 5 species being sampled in 1995 and 2000. Muttongrass and Sandberg bluegrass are the most abundant, with needle-and-thread, thickspike wheatgrass and bottlebrush squirreltail also being sampled, but occurring in low numbers. Perennial grasses decreased in sum of nested frequency in 2000 and only provide 4% of the total vegetative cover at this site. Forbs have been sparse on this site during all sampling periods.

Annual forbs were fairly abundant in 1995 with the wet spring of that year, but were infrequent in 2000 with drought. Perennial forbs are nearly non-existent with 3 species being sampled in 2000 totaling less than 1/10 of one percent average cover.

1982 APPARENT TREND ASSESSMENT

Apparent vegetative trend on this site appears stable. Plant composition is less than desirable however. The key species, Wyoming big sagebrush, shows evidence of high utilization which could eventually depress vigor and plant abundance. Soil trend appears to be declining. Of the seven applicable soil trend parameters on the evaluation checklist, five were judged as indicating a declining trend.

1988 TREND ASSESSMENT

Slight changes in ground cover measurements detected in 1988 are probably not significant. The possible exception is the increase in the cover of cryptogamic crusts. Bare soil still constitutes 30% of the ground surface, but that is an improvement from 1982 when percent bare ground was estimated at 35%. There is considerable areas of unprotected bare soil in the shrub interspaces, but serious erosion does not appear to be a significant problem on the site due to the level terrain. Trend for soil is slightly up, but in poor condition. Trend for the key browse species, Wyoming big sagebrush, is mixed. Population density has increased greatly but entirely from an increase in the decadent age class which rose from 400 plants/acre in 1982 to 5,133 by 1988. Use is currently more moderate, yet vigor has declined with 14% (733 plants/acre) of the decadent shrubs classified as dying. The data for shrub density suggests that the population has increased considerably since 1982, most likely caused by the extremely wet years of 1983 and 1984. However, sagebrush is likely poised to decline dramatically in the future if current drought conditions persist. Trend for browse is slightly down due to the high numbers of decadent individuals even though the mature population currently appears stable. The herbaceous trend is slightly up due to an increase in quadrat frequency of grasses. Forbs have remained stable.

TREND ASSESSMENT

soil - slightly up but in poor condition (4)

browse - slightly down and poised to decline due to abundant decadent sagebrush (2)

herbaceous understory - slightly up but in poor condition due to annuals (4)

1995 TREND ASSESSMENT

Ground cover characteristics have improved since 1988 with percent bare ground decreasing from almost 30% to 21%. Cryptogamic cover has also increased providing added soil protection. Even with this improvement, condition is still poor with large areas of bare ground in the shrub interspaces. Trend for browse is improved slightly. Overall density has declined considerably but the result is a smaller, healthier population. Heavy use has declined, vigor has improved, and percent decadency has declined from 53% to 15%. Recruitment is fairly good with 120 seedlings and 360 young plants/acre. Trend for the herbaceous understory is slightly down with sum of nested frequency of perennial grasses declining for three of the five species encountered. Condition of the understory is poor due to the dominance of annual grasses and forbs. Cheatgrass and sixweeks fescue make up 82% of the grass cover while 8 annual forbs contribute 99% of the forb cover. These annual grasses and forbs were not included in the 1982 and 1988 samples so no comparisons can be made.

TREND ASSESSMENT

soil - slightly up but remains in poor condition (4)

browse - slightly up (4)

herbaceous understory - slightly down, and in poor condition due to annuals (2)

2000 TREND ASSESSMENT

Trend for soil is down slightly. Percent bare ground slightly increased, but not excessively. Vegetation cover has declined slightly and sum of nested frequency of herbaceous vegetation has fallen due to drought. In addition, the ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil has also declined slightly. Very little protective ground cover is present in the interspaces between sagebrush plants, but erosion remains minimal due to the level terrain. Trend for browse is slightly down as Wyoming big sagebrush has several downward parameters. Percent decadency increased from 15% to 65% and poor vigor increased from 6% to 25% since 1995. The proportion of decadent, dying plants is moderate at 37%, representing about 1,300 plants/acre. Recruitment is low and not adequate to replace the decadent, dying portion of the population. These downward parameters are most likely the result of drought which could improve if precipitation returns to a normal level. Trend for the herbaceous understory is down and remains in poor condition. Sum of nested frequency of perennial species, which are already infrequent, decreased by half in 2000. Annual species dominate the understory at this site.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - down (1)

HERBACEOUS TRENDS --

Herd unit 09 , Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
G	Agropyron dasystachyum	_b 71	_b 53	_a 15	14	25	17	7	.33	.12
G	Bromus tectorum (a)	-	_a 251	_b 290	-	-	84	92	5.64	6.90
G	Oryzopsis hymenoides	2	-	-	-	1	-	-	-	-
G	Poa fendleriana	_b 111	_a 51	_a 45	10	52	23	20	.66	.35
G	Poa secunda	_a -	_b 17	_c 47	-	-	8	20	.40	.61
G	Sitanion hystrix	_c 50	_b 25	_a 4	13	27	13	2	.23	.03
G	Stipa comata	3	3	2	1	1	2	2	.06	.03
G	Vulpia octoflora (a)	-	_b 252	_a 31	-	-	84	13	1.82	.09
Total for Annual Grasses		0	503	321	0	0	168	105	7.47	6.99
Total for Perennial Grasses		237	149	113	38	106	63	51	1.69	1.15
Total for Grasses		237	652	434	38	106	231	156	9.17	8.14
F	Allium spp.	_B 12	_b 11	_a -	2	5	5	-	.02	-
F	Androsace septentrionalis (a)	-	4	-	-	-	2	-	.01	-
F	Calochortus nuttallii	1	2	-	4	1	2	-	.01	-
F	Chaenactis spp.	-	2	-	-	-	1	-	.00	-
F	Chenopodium leptophyllum (a)	-	_b 16	_a -	-	-	9	-	.04	-
F	Collinsia parviflora (a)	-	3	-	-	-	1	-	.00	-
F	Cryptantha spp.	_A 2	_b 18	_a -	17	2	9	-	.07	-

Type	Species	Nested Frequency			Quadrat Frequency				Average Cover %	
		'88	'95	'00	'82	'88	'95	'00	'95	'00
F	Descurainia pinnata (a)	-	_b 92	_a -	-	-	40	-	.25	-
F	Eriogonum cernuum (a)	-	2	-	-	-	1	-	.00	-
F	Erigeron pumilus	_a -	_b 8	_{ab} 2	-	-	4	1	.02	.00
F	Gilia spp. (a)	-	16	7	-	-	7	3	.03	.01
F	Lappula occidentalis (a)	-	3	3	-	-	1	2	.00	.03
F	Lepidium montanum	12	13	12	1	6	8	5	.06	.07
F	Machaeranthera canescens	_b 6	_c 16	_a -	1	3	9	-	.04	-
F	Oenothera pallida	-	1	-	-	-	1	-	.00	-
F	Orobancha fasciculata	3	-	-	-	1	-	-	-	-
F	Phlox longifolia	3	11	-	-	1	5	-	.05	-
F	Plantago patagonica (a)	-	_b 207	_a 94	-	-	73	39	1.23	.27
F	Polygonum douglasii (a)	-	2	-	-	-	1	-	.00	-
F	Schoenocrambe linifolia	_a -	_b 5	_{ab} 6	-	-	3	2	.04	.01
F	Senecio multilobatus	-	-	-	-	-	-	-	-	.00
F	Unknown forb-perennial	1	-	-	-	1	-	-	-	-
Total for Annual Forbs		0	345	104	0	0	135	44	1.59	0.32
Total for Perennial Forbs		40	87	20	25	20	47	8	0.33	0.09
Total for Forbs		40	432	124	25	20	182	52	1.93	0.41

Values with different subscript letters are significantly different at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 09 , Study no: 1

Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata wyomingensis	90	96	21.34	20.20
B	Chrysothamnus viscidiflorus viscidiflorus	40	34	4.00	2.15
B	Leptodactylon pungens	1	0	.15	-
B	Opuntia spp.	2	3	-	-
Total for Browse		133	133	25.50	22.36

BASIC COVER --

Herd unit 09 , Study no: 1

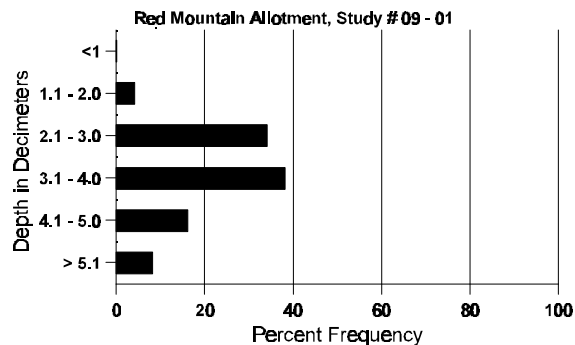
Cover Type	Nested Frequency		Average Cover %			
	'95	'00	'82	'88	'95	'00
Vegetation	351	323	4.0	3.25	34.27	30.36
Rock	12	-	9.50	0	.02	0
Pavement	7	21	1.25	0	.01	.06
Litter	398	360	68.75	55.50	43.87	43.37
Cryptogams	259	293	4.25	11.75	15.97	18.43
Bare Ground	281	298	35.25	29.50	21.13	25.96

SOIL ANALYSIS DATA --

Herd Unit 09, Study # 1, Study Name: Red Mountain Allotment

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.39	70.0 (17.56)	7.9	77.0	12.7	10.3	0.6	6.3	64.0	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 09 , Study no: 1

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre	Days Use per Acre (ha)
			'00	'00
Rabbit	14	65	400	N/A
Elk	2	1	-	-
Deer	47	30	609	47 (116)
Cattle	-	1	9	1 (2)

BROWSE CHARACTERISTICS --

Herd unit 09 , Study no: 1

Artemisia tridentata wyomingensis																				
S	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total		
		1	2	3	4	5	6	7	8	9	1	2	3	4						
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3			
	95	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6			
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2			
Y	82	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1			
	88	1	1	-	2	-	-	-	-	-	4	-	-	-	266		4			
	95	17	1	-	-	-	-	-	-	-	18	-	-	-	360		18			
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3			
M	82	10	25	35	-	-	-	-	-	-	65	3	2	-	4666	23 26	70			
	88	26	27	11	-	-	-	-	-	-	58	2	4	-	4266	24 21	64			
	95	73	68	5	-	8	8	6	-	-	168	-	-	-	3360	33 42	168			
	00	61	26	3	2	-	-	-	-	-	91	-	1	-	1840	29 31	92			
D	82	-	1	5	-	-	-	-	-	-	-	4	1	1	400		6			
	88	30	32	14	1	-	-	-	-	-	52	1	13	11	5133		77			
	95	15	7	5	1	1	-	3	-	-	20	-	-	12	640		32			
	00	116	49	4	7	-	-	1	-	-	111	-	-	66	3540		177			
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0			
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	980		49			
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1380		69			
% Plants Showing		Moderate Use			Heavy Use			Poor Vigor			%Change									
		'82			34%			52%			05%			+47%						
		'88			41%			17%			19%			-55%						
		'95			39%			08%			06%			+20%						
		'00			28%			03%			25%									
Total Plants/Acre (excluding Dead & Seedlings)												'82	5132	Dec:	8%					
												'88	9665		53%					
												'95	4360		15%					
												'00	5440		65%					

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysanthamnus viscidiflorus viscidiflorus																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	-	1	-	-	-	20	1	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	-	-	-	-	-	-	-	3	-	-	-	60	3	
	00	4	-	-	-	-	-	-	-	-	-	4	-	-	-	80	4	
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	41	-	-	2	-	-	-	-	-	-	43	-	-	-	860	23 32 43	
	00	29	-	-	2	-	-	2	-	-	-	33	-	-	-	660	18 22 33	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	3	-	-	1	-	-	-	-	-	-	3	-	-	1	80	4	
	00	10	-	-	3	-	-	1	-	-	-	8	-	-	6	280	14	
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		Moderate Use			Heavy Use			Poor Vigor			%Change							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			02%			+ 2%							
'00		00%			00%			12%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	0%			
												'88	0		0%			
												'95	1000		8%			
												'00	1020		27%			
Cowaniana mexicana stansburiana																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	30 41	0	
% Plants Showing		Moderate Use			Heavy Use			Poor Vigor			%Change							
'82		00%			00%			00%										
'88		00%			00%			00%										
'95		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'82	0	Dec:	-			
												'88	0		-			
												'95	0		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	23	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'82		00%				00%				00%								
'88		00%				00%				00%								
'95		00%				00%				00%								
'00		00%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)														'82	0	Dec:	-	
														'88	0		-	
														'95	0		-	
														'00	0		-	
Juniperus osteosperma																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	-	1	-	-	-	-	-	-	-	1	-	-	-	66	36	15	1
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'82		100%				00%				00%				+ 0%				
'88		00%				00%				00%								
'95		00%				00%				00%								
'00		00%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)														'82	66	Dec:	-	
														'88	66		-	
														'95	0		-	
														'00	0		-	
Leptodactylon pungens																		
M	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	19	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'82		00%				00%				00%								
'88		00%				00%				00%								
'95		00%				00%				00%								
'00		00%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)														'82	0	Dec:	-	
														'88	0		-	
														'95	60		-	
														'00	0		-	

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	1	-	-	-	-	-	-	66		1	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	82	1	-	-	-	-	-	-	-	-	-	-	-	-	66	4	16	
	88	3	-	-	2	-	-	-	-	-	-	-	-	-	333	3	6	
	95	2	-	-	-	-	-	-	-	-	-	-	-	-	40	4	13	
	00	3	-	-	-	-	-	-	-	-	-	-	-	-	60	3	7	
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'82		00%				00%				00%				+83%				
'88		00%				00%				00%				-90%				
'95		00%				00%				00%				+60%				
'00		00%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)												'82	66	Dec:	0%			
												'88	399		0%			
												'95	40		0%			
												'00	100		40%			